

ABSTRACT OF THE DISCLOSURE

Disclosed are method and apparatus for obtaining relatively high dynamic range images using a relatively low dynamic range image sensor without significant loss of resolution. The image sensor has an array of light-sensing elements with different sensitivity levels in accordance with a predetermined spatially varying sensitivity pattern for the array of light-sensing elements. An image of a scene is captured with the image sensor and stored as brightness values at respective pixel positions in a linear or two-dimensional uniform grid. The brightness values of the captured image at the pixel positions are then used to estimate the brightness values at off-grid positions of a uniform off-grid array located at respective interstices of the pixel position grid. The estimated off-grid brightness values are either used directly as the pixel brightness values of a relatively high dynamic output image or interpolated to derive resampled on-grid brightness values at the pixel positions of the pixel position grid to provide a relatively high dynamic range output image. Alternatively, the brightness values of the captured image are interpolated by an on-grid interpolation filter to derive pixel brightness values of a relatively high dynamic range output image, each pixel brightness value of the output image being derived from a corresponding plurality of the captured image brightness values. In each instance, either the captured image brightness values or the pixel brightness values of the output image may be compensated for non-linearities of the radiometric response function of the light-sensing elements of the image sensor.